



Johnson Matthey Fuel Cells

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Hydrogen Production, Purification and Fuel Cell Components

**Mid-Atlantic Regional
Hydrogen Infrastructure Forum**

March 12, 2003

Wilson Chu

Johnson Matthey PLC

Corporate Dimensions:

- ▶ **4 divisions:**
 - ▶ **Catalyst & Chemicals, Ceramic Materials, Pharmaceuticals, Precious Metals**
- ▶ **\$8 billion annual sales**
- ▶ **8,000 employees**
- ▶ **34 countries**

Johnson Matthey Fuel Cells Ltd:

17.5% Anglo Platinum, 82.5% Johnson Matthey PLC



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Johnson Matthey Fuel Cells Business

A leading developer and provider of fuel cell system components including:

- ▶ **Anode and Cathode Electrocatalysts**
- ▶ **Membrane Electrode Assemblies (MEAs)**
- ▶ **Fuel Processors**
- ▶ **Catalysts and Catalyzed Components**
- ▶ **Hydrogen Purification Membranes**

Johnson Matthey Fuel Cells Operations

- ▶ United States (50 employees):

West Chester, PA - Fuel processor development and testing; Hydrogen purifier manufacturing; Catalyst development

West Deptford, NJ - Electrocatalyst manufacturing and testing

- ▶ United Kingdom (110 employees):

Sonning Common, England - MEA and Catalyst development

Swindon, England - MEA and Catalyst manufacturing

West Chester, PA Facility



West Chester, PA Fuel Processor Test Lab



Sonning Common, UK

MEA Test Lab



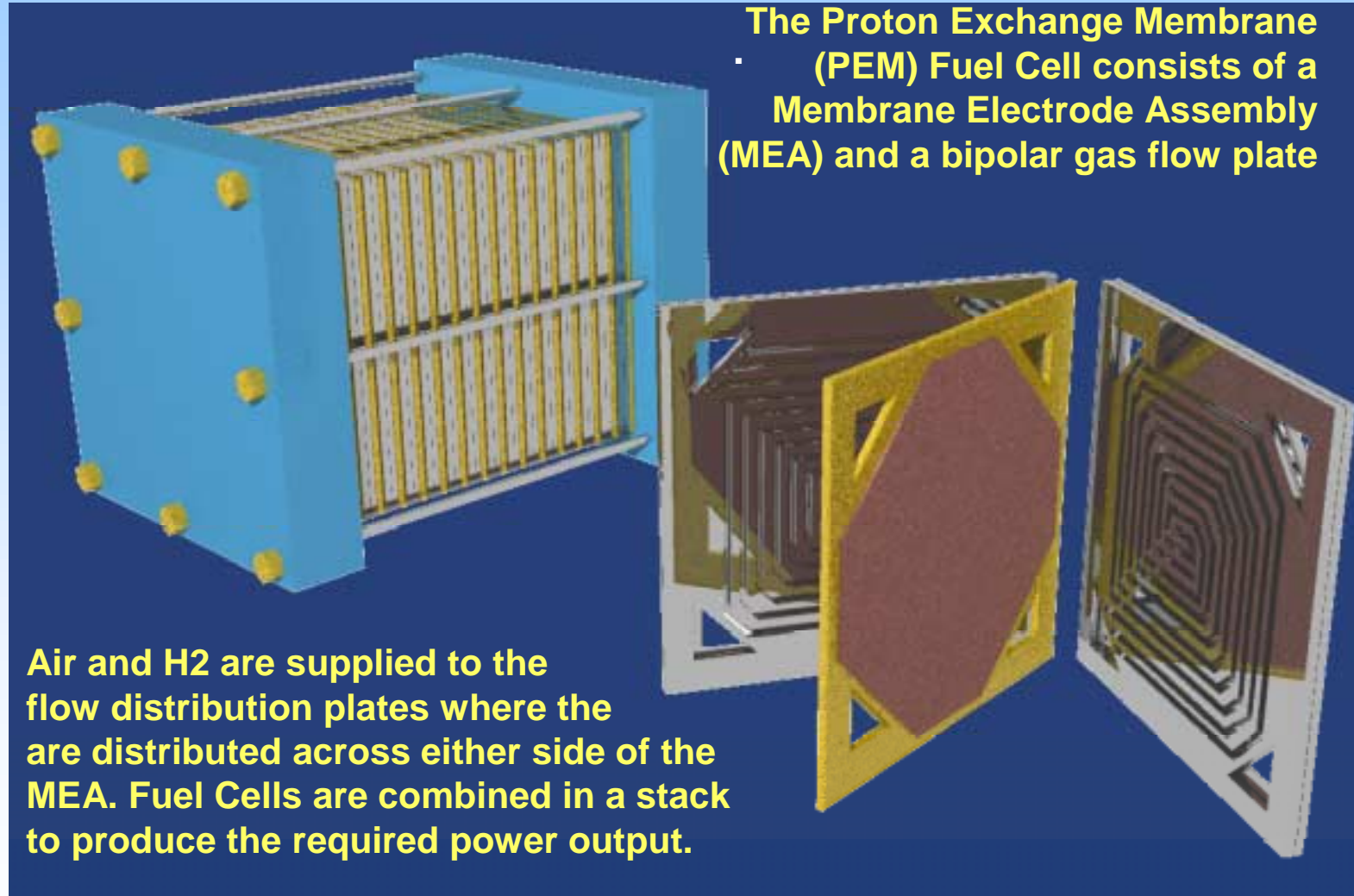
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Swindon, UK

Manufacturing Plant



PEM Fuel Cell Stack Components



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Hydrogen Purification

High flux rate ceramic and metallic hydrogen separation membranes



Hydrogen Production

FP05 Fuel Processor

- ▶ Specifications:
 - Autothermal reforming
 - 2 to 10 kW output
 - 160 SLM H₂
 - 78% Efficiency
 - 24" x 24" x 50"
 - Steady State CO = 50 ppm
 - Non-pyrophoric WGS cat.
 - Natural gas and LPG
- ▶ Scale-up to 75 kW



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Integrated Fuel Cell CHP System

5 kW Demonstration



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